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ACTIVITY OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Publications. — The *Annuaire international de Législation, 1941*, is in the press and will be ready next July. Like its predecessors, this Yearbook, which is the 31st of the series, is published only in French and contains the most important agricultural laws promulgated in the different countries in the year 1941, assembled in a systematic order. A foreword, emphasising the new trends of world agricultural legislation during the year, opens the volume.

There is a strong tendency to oppose the excessive morceling of the soil through consolidation and thus contribute to the strengthening of an economically rational agricultural structure. This policy of land reconstruction is still too little widespread, either for sentimental and moral reasons or on account of a juridical concept opposed to interferences with the right of private property even when suggested by reasons of public utility. The International Institute of Agriculture, continuing its studies on land regime in Europe and its economic and social effects, in its "Monthly Bulletin of Agricultural Economics and Sociology" No. 3 (1942) published an article on *The Problem of the Consolidation of Agricultural Holdings in Europe* which shows the advantages of this land policy followed in various countries under different economic and agricultural conditions.

The development of labour organisation and of the use of agricultural machinery, the building possibilities of new materials, the more complete knowledge of soil and climatic conditions, the requirements of air defense as well as social development, are turning rural architecture towards new solutions of these problems, which cannot be found in the traditional types of building. A study published in No. 3 (1942) of the "Monthly Bulletin of Agricultural Science and Practice" under the title *Improvements in Rural Buildings*, surveys the possibilities of development of rural building in the following respects: Reciprocal disposal of the different quarters – Arrangement of the buildings – Their height – Structure of walls – Structure of walls and ceilings – Choice of building material – Interior installations.

Number 4 (1942) of the " Monthly Bulletin of Agricultural Economics and Sociology " which has just been published, contains an article on the world wide movement towards the city. After surveying the various definitions of rural and city population now commonly used in the different countries, the article follows the process of the cityward movement in a great number of countries. This study, based on a great wealth of statistical material, goes back to the middle of the last century. The last chapter is devoted to a general study of the causes and consequences of this process.

At the end of the oil season in the Mediterranean Basin which includes almost the whole of the olive oil producing regions, it was interesting to know the results of olive oil production in the world.

The information which, in spite of the difficulties of the present times, the Institute has been able to gather, have made it possible to prepare a brief survey on this question which has appeared in No. 3 (1942) of the " Monthly Bulletin of Agricultural Statistics " under the title: *World Oil Production in 1941-42.*

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INTERNATIONAL BULLETIN
OF PLANT PROTECTION

1942 No. 5

DISCOVERIES AND CURRENT EVENTS *

LIBYA.

Association between the Larvae of the Diptera *Ceratitis capitata* and *Lonchaea splendida* †

The living together of larvae of Trypetidae with those of Lonchaeidae has long been observed over and over again in the different parts of the world and also in Tripolitania. I have already had occasion to cite the case of the association of the larvae of *Ceratitis capitata* Wied. with those of *Lonchaea splendida* Loew. in a work which constitutes a preliminary note to a more detailed study completed later on and which will form the subject of another publication.

For the present I will only give a general outline of the observations made over a period of five years, establishing the relations which exist between the two diptera in the western part of Libya.

C. capitata, after having effected the first annual generations at the expense of different fruits (citrus, apricots, peaches, etc.), passes, from July, onto chillies, the pods of which can be pierced at practically any stage of their development, when at the size of a hazelnut up to full maturity; the varieties susceptible to attack are nearly all those cultivated in the zone where investigations were carried out (Provinces of Tripoli and Misurata) and included both those with mild fruits and those with pungent fruits, the latter being habitually used by the local population as a the customary seasoning of the different foods.

It may seem peculiar that *C. capitata* attacks this solanaceous plant in Libya while this is not the case in the Mediterranean regions which, as regards climatic conditions, greatly resemble the Italian colony. It is to be presumed that the causes should be sought for in the different floristic conditions and chiefly in the fact that in the zones of Tripoli and Misurata, during the summer months, there is practically no fruit to be attacked. In fact, after the ripening and harvesting of the Indian figs, which is effected in July, there is almost no other fruit until the persimmons mature, which is in September. In the interval, which is nearly three months, *C. capitata* turns to capsicum fruits.

* Under this and the third heading the countries are arranged in French alphabetical order.

† Communication from Dr. Giuseppe M. MARTELLI, Assistant Director of the Agricultural and Zootechnical Experiment Centre of Libya, Chief of the Section of Agricultural Entomology and Zoology, Tripoli, Libya.

The number of larvae found in each chilli pod varies fairly considerably and depends both on the season and on the ovipositions which take place in the same pod. I was able to count a minimum of 6 up to a maximum of 153 larvae in the height of summer, with a general average of about 30 larvae; towards the end of summer and in autumn, on the contrary, the highest number found were 19.

Immediately after the attack of *C. capitata*, that much more serious of *L. splendida* takes place, the eggs being deposited in the openings made by the larvae of the first dipter or even in the punctures. The number of larvae of *Lonchaea* is much higher than that of *Ceratitis*, running to several hundred; thus I counted in one sole pod, a minimum of 39 up to a maximum of 737 larvae of *L. splendida*. This dipter causes greater damage than *C. capitata*, owing to both the greater number of larvae in the same pod and to the presence of one or several symbiotic bacteria of these larvae.

Consequently, while the chilli pods infested by *C. capitata* only, could still be partly utilized for ordinary kitchen use after removing the spoiled parts, when attacked by *L. splendida* they very rapidly lose their edible properties as the entire pulp within a short time turns into a decomposed and malodorous mass.

L. splendida damages not only chillies but also other horticultural species: citrus fruits and peaches already attacked by *C. capitata* and even potato tubers attacked by the potato moth (*Phthorimaea operculella* Zell.). Infestation by *L. splendida*, however, does not necessarily follow that of other insects, as even on chillies free from entomological manifestations and only injured, in rare instances I have found larvae. Without any doubt, as I was able to establish experimentally, *L. splendida* cannot attack perfectly sound fruits or vegetables.

In view of these prerogatives, *L. splendida* has essentially saprophytic characteristics although some manifestations of hemiparasitism cannot be entirely overlooked.

As the damage caused by these two diptera are appreciably greater than the total of the damage taken separately, the association of the larvae of the two species gives rise to an action of synergy; and since taking part in causing the damage, besides the two larvae, are also the symbiotic bacterium of *C. capitata* (*Escherichia ellingeri*), studied by Ciferri, and at least one probably common, putrifying bacterium, the synergy should be considered as multiple.

The conclusions at which I arrived at the end of my experimental investigations are the following:—

(1) *C. capitata* attacks sound chillies of all the varieties cultivated in Libya.

(2) *L. splendida* does not attack sound capsicums, but only those which have already been attacked by *C. capitata* or which have been damaged in some other way.

(3) The ordinary symbiotic coccobacillus of *C. capitata* is not necessary for *L. splendida*.

(4) It has not yet been possible to isolate specific symbiotic bacteria of *L. splendida* and, in the present state, if symbiosis is admitted, it must also be admitted in the case of ordinary putrefaction bacteria.

(5) From the biological viewpoint, *L. splendida* is a parasite of chillies while economically it is manifested as a saprophyte or more precisely as a hemiparasite.

(6) The association of the larvae of the two diptera and the corresponding bacteria is a multiple synergy.

VARIOUS QUESTIONS

The Mineral Intake and the Resistance of Plants to Microbial Diseases (*concluded*) *

Maize cultivated in a complete mineral solution and protected from microbes, is resistant to microbial diseases.

The inoculation of smut in the form of spores or ' yeast forms ' taken from pure cultures, into maize plants grown in a complete and aseptic mineral solution always gave negative results in my experiments; more exactly, no apparent symptom revealed the presence of the fungus in the plant.

The same relative failure may be noted each time the stalks of maize plants cultivated in the open are inoculated, inoculation being carried out when the weather was fine; and yet spontaneous infection by dry spores dispersed by the wind is sometimes followed by a rapid general spread of the disease. This occurs when contamination coincides with the development of the ears and when the evolution of the disease is favoured through wet weather. After a few days incubation and the return of fine weather, the entire terminal part af the ear becomes hypertrophied and projects out of the sheath, clearly showing the seed transformed into black swellings the size of a hazelnut or small prune.

This infection of the female flowers by the stigmata is frequent under ordinary conditions of cultivation, but rarely has much effect. That infection has occurred is seen from the presence of one or several smutty seed at the tip of the ear; the seed, however, has to be broken to see if infection has taken place as, taken as a whole, the ear does not appear abnormal in any way.

All these so varied aspects of smut development have long been known; they are attributed to a variation in the virulence of the infecting agent; nothing of the kind, it is the degree of resistance of the plant which regulates all these different phases of the development of the parasite. This latter is always in wait for a physiological depression of the plant and takes full advantage when this occurs.

The fact which now interests us is that the occasion thus defined arises more frequently in certain soils. It may be noted that the plants cultivated in a

* Note of Prof. PIERRE MAZÉ, Pasteur Institute, Paris, France.

complete and aseptic mineral solution possessed a sufficient immunity because they are supplied regularly with nutrients, a condition which my experiment plot does not fulfil to the same extent. It is not impossible, however, to find ground where the conditions of vegetation come closer to those obtained with a complete solution. This is precisely the case of the sewaged land of Paris.

After 30 successive years of forage maize crops on a field of about 12 hectares, smut had passed unnoticed; the overseer, however, had observed some suspected swellings, but he was unaware of their signification or origin; this is to say that smut did not cause any appreciable damage to the crop. These swellings appeared each year on some maize plants growing round about the sewage outlet.

A thick layer of black mud covered the ground for a radius of several metres and it was only in this area that I observed the presence of the disease with its various symptoms, impressive in size and form. If contamination remains so restricted despite the enormous quantity of spores which can be dispersed, it is because the plant is in a condition to check the development of the *Ustilago*. Owing to the variety and high content of mineral and organomineral elements, therefore, sewage has a more marked influence than the exclusive mineral fertilizers. Here, however, it is rather the nature of the environment which is concerned. Of the same origin and having fairly similar physical properties, the two soils differ by the humus which they contain, superoxidized and leached in my experiment field, rich and constantly renewed in the sewaged land.

The influence of mineral nutrition on the resistance of maize to microbial diseases may now be briefly summed up:—

(1) Complete and aseptic mineral solutions make maize resistant to smut.

(2) The sand of sewaged land posseses the same property when it is abundantly fertilized with mineral fertilizers.

(3) The sand containing superoxidized humus which has not received organic fertilizers for over 30 years only has to a lesser degree the power of maintaining the resistance of the plant to injury by *Ustilago maydis*.

The resistance conferred on the plant by the complete mineral solution applies to all microbes.

It is justifiable to attribute these results to the relative facility with which the plant obtains in these three mediums the elements it requires, the recuperation of the state of resistance being, as seen above, a question of rapidity in elaborating the antimicrobial substances.

It should be noted, however, that so far it is only a question of one parasite of maize; consequently, there is nothing to prove that the conclusions stated can be generalized. The study of the disease of leaf curl of maize raises this reserve.

The leaf curl disease has not yet been reported on maize, at least as far as I am aware. It resembles that of the potato and like it is produced by

an invisible filtering microbe. It appeared some years ago in my experiment field following a change in the maize seed employed. Of too mixed a strain owing to being cultivated beside other varieties, the large yellow variety used was replaced by another, supposed to be a pure strain. It was some years before the disease drew my attention. The plants attacked grew slowly; in the sun the leaves developed a pronounced curl; those at the base withered progressively, starting from the tip; some plants died off, others remained sterile, those attacked the least produced seed which transmitted the disease.

Cultivated in complete aseptic solutions, the plants present the symptoms reported above while at the same time the roots are affected in their turn by peculiar deformations; the main axes often terminate hooked or spiral; their ramifications, very short, develop into small club-shaped formations. The plant as a whole has a rigid aspect and does not grow much.

Maize grown from diseased seed in a complete mineral solution rarely died off. With the development of the vegetation a progressive improvement was always observed and it was not unusual to find that many plants recovered fairly rapidly the aspect of healthy and vigorous specimens.

The recovery becomes evident and general when, after the placing of the seedlings in flasks, there is a period of very warm and sunny days. The nocturnal transudations abundant while it is always wanting in diseased or deficient plants. The roots lose their apparent rigidity and elongate very rapidly; they acquire that regular and flexible appearance which gives them, together with the long and slender ramifications, the very pleasing aspect of healthy and vigorous organs. The complete solution, therefore, acts as an environment which generates both resistance and recovery with the assistance of abundant insolation.

Smut and leaf curl disease being produced by widely differing microbial parasites, the properties of the complete mineral solution in connexion with the resistance of the plant to infectious diseases may be generalized.

Deficiency disorders.

All cultivated soils do not necessarily contain all the elements which enter into the complete nutrient solution which I established for maize. The soils which are deficient in any one of these nutrients are unsuitable for maize cultivation and probably for many other species cultivated or otherwise. The disorders due to a more or less marked deficiency in a mineral element necessary for growth must be fairly considerable.

The solution which is suitable for maize, moreover, does not allow of the normal growth of other species besides gramineous and, in particular, leguminous plants. After an apparently normal start, the leaves and shoots become etiolated. It is a question of a chlorosis due to a want of iron; maize does not suffer from this deficiency because the acid secretions of its roots, or more properly speaking of the absorptive root hairs, enable the plant to absorb iron in the presence of calcium bicarbonate which precipitates this element. If the iron is introduced into the solution in the form of citrate, lactate, tartrate, malate, etc.,

compounds which keep the iron in solution despite the bicarbonate, the chlorotic legumes recover.

The chloroses which prevail in calcareous soil reveal the same mechanism. For a long while they were attributed to an excessive absorption of limestone. Chalky soils in fact, are badly formed and do not comply with the law of physiological relations. This is a serious defect, the influence of which, however, only affects the roots indirectly. The limestone found in the plant is but a consequence of chlorosis. It accumulates in the leaves like all the other mineral elements relatively, because the roots continuing their work at reduced speed, supply the aerial parts of the plant with more mineral nutrients than they can utilize, the photosynthetic elaboration being suspended.

In a medium where the iron is rendered insoluble, the manganese and zinc and probably other elements precipitate with it; if it is iron which first or most markedly reveals the symptom of deficiency, manganese and zinc may closely follow; also when the practical side of the question is considered, a judicious solution consists in not overlooking the three possible deficiencies in the presence of a chlorosis appearing on plants growing in chalky soil.

Chlorosis of truck crops grown on sewaged land round Paris.

Iron deficiency can appear in unlooked for conditions. This is what occurred in the sewaged land of Paris. All crops suffered from chlorosis when the soil received an excessive quantity of sewage. The soil is then considered as ' burnt ', only gramineous plants flourish. A more methodical application, however, makes it possible to obtain flourishing crops but not always free from chlorosis. The disease regularly appears on the same points developing according to the regular circles determined by the depressions that the naked bud is incapable of disclosing.

It seems that the disease, starting from a central point, spreads in a regular manner in every direction. Called upon to examine the situation, first of all I found that the plants carried no parasite, a finding more or less evident, a parasite does not invade all vegetables indiscriminately.

The waste waters from the Seine and the Marne are very calcareous; they are, therefore, in principle, like my complete solution, unsuitable for the normal growth of all cultivated species outside of gramineous plants. Spraying with a 1/1000 solution of perchloride of iron by the farmer concerned and at my request, to a plot of chlorotic cabbages, showed in fact that it was a case of iron deficiency.

The disorder prevails solely in the parts where the soil is depressed; evaporation is more active because the level of the waste waters is maintained for a longer period in contact with the open air; the iron oxide precipitate and particles of soil are here more heavily coated with limestone than elsewhere; only gramineous plants are capable of dissolving this limestone and absorbing the iron oxide after having made it soluble; the chlorosis which effects other species can be prevented by applications of finely divided iron sulphate before sowing

or pricking out; a more direct method consists in spraying with soluble salts of iron, manganese and zinc in the proportion of 1 gm. of each salt to 5 to 10 litres water; absorption is immediate and the result rapid.

Deficiency disorders, therefore, may prevail in the soils richest in fertilizer elements; the example of sewaged land menaced by sterilization through the waste waters with a very high calcium carbonate content, is very instructive and confirms the conclusions drawn earlier on, namely, that fertility may be defined by the degree of facility with which the soil cedes to the roots all the elements necessary to the plant.

It is imagined, however, I repeat, that a soil could be deprived of one or even several of the mineral elements indispensable to a given species. Organic and mineral fertilizers contain traces; but when it is a question of forage legumes which occupy the land for years and even more so of arboriculture, the traces of minor elements are soon exhausted and the crop gradually wastes away without any apparent reason.

It was thus that Hoagland in 1933 showed that the ' small leaf ' disorder which was prevalent in the orange, citron and grapefruit orchards in California is due to a want of zinc. The application of zinc salts as mineral fertilizer and better still the spraying of dilute solutions of zinc salts on the leaves causes the radical disappearance of the disease.

Heart rot of the sugarbeet is caused by boron deficiency; it is attributed to the fungi: *Sphaerella tabifica* and *Peronospora schachtii*. This is an example of a microbial disease grafting itself onto a disorder caused by a want of boron which prepares the way for parasitic infection. Application of mineral fertilizer containing boron prevent all microbial infection.

Conclusion.

I intended to indicate the way which modern agriculture should follow by means of this brief review on the mineral nutrition of the plant and its relation with microbial resistance; a simple concept guides this way: know the requirements of the plant and establish the means of making it render all it can produce. There is nothing new in this, as the grower has never had any other ambition; until now he has been unable to attain his ambition as he only employed empiric methods; therefore, some result is already attained in discerning the path to be followed and in affirming by the few facts acquired that the plant nourished methodically, like any other living object, will faithfully recompense all the cure it is given. In this way Blackeslee demonstrated by cultivation in nutrient solutions that the tomato, *inter alia*, gives extremely high yields.

Unfortunately, these methods can only be put into practice by very experienced specialists, cultivation in liquid media can only succeed if protection is taken against microbes. If possible to bring to a successful end without observing this indispensable condition, it is by dint of precautions and supervision; all who know the difficulties to be overcome are aware that this sort of non-aseptic cultivation, even practised on a small scale, with the same apparatus

and in the same place, always end by coming up against a proliferation of noxious microbes extremely difficult to prevent and even more so to check. Numerous species of microbes in fact, develop in the complete mineral solutions wherein the roots constantly release various organic compounds and when these substances are not sufficient to maintain them, not infrequently then also attack the roots; if a harmful species turns up, the crop may be destroyed in a few days.

As is known, this is not the case in the field; the microbes, more or less fixed on the solid particles cannot follow the roots in their development; the harmful species which the roots encounter in their progress do not remain long in contact with the piliferous layer, more susceptible to microbial attack than the other parts, as it advances several centimetres par day.

It is thus considered that a nutrient solution incorporated with pure sand, realizes all the advantages of a complete aseptic solution, when it combines as such all the mineral elements indispensable to the plant.

We have seen that the sewaged land of Paris fills these conditions; the crops to day are vigorous and sound.

Other soils naturally combine the same advantages, these are the polders and granitic sands of the Brittany coast. There the plants find all the mineral elements which form the terrestrial crust; these soils are universally reputed for the quality of the seed, tubers, onions, etc. they produce.

The diseases due to invisible microbes considered until recent nears as phenomena of degeneration are, in fact, unknown for the reasons which I have amply indicated.

Permeable deep soils more or less resemble these perfect soils but differ because the elements which constitute them disequilibrate the complete solutions by rendering insoluble some of the substances contained, thus making their absorption difficult if not impossible.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Belgium. — A Decree of March 10, 1942 authorizes the capture of sparrows by means of the draw-net known as ' tirasse ' from April 15 to September 15, 1942 inclusive throughout the country. (*Moniteur belge*, Bruxelles, 22 mars 1942, nº 81, p. 1777).

France. — Ministerial Decree of May 31, 1941 institutes at the Ministry of Agriculture an Advisory Board for plant protection, commissioned with the study of questions relative to insects, cryptogamous diseases and other pests of crops, plants or their products.

The Board proposes the list of crop parasites for which control is compulsory and specifies the modalities to be carried out according to the regulations in force.

The Board is also called upon to pass an opinion on the nature of the methods of the treatments and products to be advocated for the conservation of crops. (*Journal officiel de l'Etat français*, Vichy, 4 février 1942, LXXIV^e année, n° 30, p. 498-499).

*** Ministerial Decree of July 1, 1941 nominates the members of the aforesaid Advisory Board. (*Ibid.*, p. 499).

*** A Ministerial Decree dated December 23, 1941 specifies that for the payments of dues for phytosanitary inspection and the set registration tax regarding control of exports, the Directors of the Agricultural Services shall establish for each tax district, collection lists which will be forwarded to the prefects in charge together with the notification forms to be sent to the debtors. (*Ibid.*, 15 janvier 1942, n° 13, p. 227).

*** By Ministerial Decree of December 23, 1941, the following animal and plant diseases are recognized as being dangerous to French crops:— the Colorado beetle (*Leptinotarsa decemlineata*), Japanese beetle (*Popillia japonica*), oriental fruit moth (*Laspeyresia molesta*), nun moth (*Lymantria monacha*), potato moth (*Phthorimaea operculella*), Argentine ant (*Iridomyrmex humilis*), Mediterranean fruit fly (*Ceratitis capitata*), fir tree aphis (*Dreyfusia nüsslini*), San José scale (*Aonidiella perniciosa*), mulberry scale (*Diaspis pentagona*), cottony cushion scale (*Icerya purchasi*), dodders (*Cuscuta epithymum, C. trifolii, C. epilinum, C. suaveolens*), chestnut bark disease (*Endothia parasitica*), leaf cast of Douglas fir (*Rhabdocline pseudotsugae*) and potato wart disease (*Synchytrium endobioticum*).

The control of all these parasites, from their first appearance to any stage whatsoever of their development is compulsory throughout the territory of France.

The importation of plants or parts of plants from countries where the presence of one of these parasites is reported is prohibited. However, a special authorization for importation may be granted which will specify the ports and customs offices designated for this purpose and the modalities regarding entry.

With a view to preventing all serious invasion, the Associations for the control of crop pests are commissioned from now onwards with the local organization of the control operations and the application of treatments against the aforementioned parasites. (*Ibid.*, 24 janvier 1942, n° 21, p. 345).

*** By Ministerial Decree of January 30, 1942, the control of the Colorado beetle (*Leptinotarsa decemlineata*) has been made compulsory according to the modalities indicated below, throughout metropolitan France with the exception of Corsica free from this parasite.

Apart from gardens, the cultivation of potatoes is only authorized in the fields or plots designated beforehand by the mayor of the commune. The sites will be determined in such a way that the crops, for each locality, are grouped into a very small number of centres.

The lay-out of the fields proposed by the mayor will be addressed to the Director of agricultural services who, if necessary, will make any changes considered advisable.

Owing to the necessity of using insecticidal preparations, the cultivation of potatoes together with other plants, serving as food for man and animals, is prohibited.

Everyone growing potatoes is required to be on the look-out for the eventual appearance of the Colorado beetle in his crop.

As soon as anyone ascertains the presence of the Colorado beetle, he must advise the Plant Protection Association or, if this is not possible, the mayor who will inform the Director of agricultural services of the first discovery.

All potato growers must destroy the eggs, larvae and adult insects as soon as found in the field, first by careful collection, then by means of arsenical treatment.

The Plant Protection Association or, in its place, the mayor organizes control operations in the commune. To this end, gangs are formed for prospection and collection which must work at least one afternoon per week beginning from the first discovery of the Colorado beetle or, at the latest, from May 15. These gangs will be constituted with the participation of all concerned, of the unemployed and schoolchildren.

All potato fields should be examined at least once a week. The adult insects, eggs, and larvae will be carefully collected and destroyed. These inspections should be continued up to July 15 and in gardens up to harvesting.

All potato fields should be given at least two sprayings of lead arsenate, lime or alumina mixtures. Late varieties must be given three treatments throughout France and four treatments in the following departments: Aisne, Ardennes, Aube, Côte-d'Or, Doubs, Jura (occupied zone), Marne, Haute-Marne, Meuse, Meurthe-et-Moselle, Nord, Oise, Pas-de-Calais, Haute-Saône, Seine, Seine-Inférieure, Seine-et-Marne, Seine-et-Oise, Somme, Vosges, Yonne. Any heavy infestation will necessitate supplementary treatment on the part of the growers.

The dose of arsenic will vary according to the arsenic content of the products employed; it will be at least 1 kg. per hectolitre of water for diplumbic arsenic containing 11 per cent. arsenic, or 500 gm. for calcium arsenic with 25 per cent. arsenic.

Insecticidal dusts, in place of spraying, will only be authorized in certain cases determined beforehand by the Director of agricultural services.

In each commune, the mayor assisted by the president of the association for the control of crop pests, must ascertain, together with the director of agricultural services, that the necessary quantities of insecticides and sprayers required for control operations will be at the disposal of the farmers in good time and within easy reach.

In all Departements must be constituted before May 1, 1942, communal, inter-communal or cantonal associations for the permanent control of crop pests as established by Law of March 25, 1041 (Articles 2 to 7) [see this *Bulletin*, 1941, No. 10, p. 188].

Jointly with the mayor, these associations will be responsible for the local organization of control operations: prospecting, collecting, insecticidal treatments.

The Ministerial Decrees of February 18 and April 3, 1941 [see this *Bulletin*, 1941, No. 11, pp. 207-208] regulating the control of the Colorado beetle are repealed. (*Ibid.*, 8 mars 1942, nº 58, p. 960).

Italy * — A Ministerial Decree of March 14, 1942 declares compulsory in the Province of Belluno the control of the cockchafer (*Melolontha melolontha*) by means of collecting the adult insects.

*** A Ministerial Decree of March 31, 1942 makes compulsory in the Province of Rovigo the control of the oriental fruit moth (*Cydia molesta*) to be carried out by means of cutting and the immediate destruction of shoots which become infested, the collection and destruction of large shoots, pruning loppings, attacked fruits, the destruction of hibernal forms of the insect in warehouses (storing of the baskets in suitable premises, fumigation with sulphur and hydrocyanic acid gas) and by any other methods which will be indicated by the Royal Observatories of Phytopathology.

The Observatory at Verona will indicate the modalities to be followed in executing the control operations and will supervise their application, assisted in this task by the provincial Commissariat for plant diseases.

The horticultural and fruit-growing Section of the provincial Association of the agricultural producers of Rovigo is charged with the organization and inspection of the control operations to be carried out by and at the expense of the proprietors and usufructuaries of peach orchards in the aforesaid Province. The Section is also commissioned with the execution of control operations at the expense of infractors and those who have delayed starting.

*** Another Ministerial Decree of the same date declares the control of *C. molesta* compulsory in the Province of Brescia, the said control to be carried out according to the modalities established by the above-mentioned Ministerial Decree relative to the control of this insect in the Province of Rovigo.

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*** With a view to controlling the pink bollworm [*Platyedra gossypiella*] and the spiny bollworm [*Earias insulana*] of the cotton plant, an Order dated February 17, 1942 lans down that all uncollected stalks, leaves, bolls, seeds and, in general, all plant trash remaining from the 1941 cotton crops, must be destroyed by burning before March 15, 1942 at the latest. (*Ibid.*, 6 mars 1942, nº 1532, p. 192).

* Communication of the Ministry of Agriculture and Forests, Rome, to the International Institute of Agriculture.

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